

CLAIMS

What is claimed is:

1. A viscoelastic composition comprising an aqueous solution having a minimum of about 0.01%w/v and a maximum of about 20%w/v of a viscoelastic polymer based upon the total volume of the viscoelastic composition and further having tris[hydroxymethyl]aminomethane.
2. The composition of claim 1, wherein the concentration of tris[hydroxymethyl]aminomethane is a maximum of about 50mM and a minimum of about 0.1mM based upon the total weight of the viscoelastic composition.
3. The composition of claim 1, further comprising a polyol.
4. The composition of claim 3, wherein at least one polyol is selected from the group comprising pentahydric alcohols, hexahydric alcohols and heptahydric alcohols and mixtures thereof.
5. The composition of claim 4, wherein the polyol is a hexahydric alcohol.
6. The composition of claim 5, wherein the polyol is mannitol.
7. The composition of claim 5, wherein the polyol is sorbitol.
8. The composition of claim 3, wherein the concentration of the polyol is a minimum of about 0.1%w/v and a maximum of about 15%w/v based upon the total volume of the viscoelastic composition.
9. The composition of claim 1, wherein the concentration of tris[hydroxymethyl]aminomethane is a minimum of about 0.5mM and a maximum of about 30mM.
10. The composition of claim 1, wherein the ratio of the viscosity of the viscoelastic composition to the viscosity of a comparable viscoelastic composition having no polyol and tris[hydroxymethyl]aminomethane is a minimum of about 1 and a maximum of about 2.5.
11. The composition of claim 1, wherein the percentage of quenching is a minimum of about 45%.
12. The composition of claim 1, wherein the viscoelastic polymer is selected from the group comprising hyaluronic acid, hydroxypropylmethylcellulose, polyacrylic acid, carbopol, polyvinylalchol, polyvinylpirrolidone, condroitin sulfate, polycarbophil, methylcellulose, carboxymethylcellulose, hydroxyethylcellulose,

hydroxypropylcellulose, ethylcellulose, polyethylene oxides, alginic acid, pectin, xanthan gum, dextrans, collagen and derivatives thereof and salts thereof and combinations thereof.

13. The composition of claim 1, wherein the viscoelastic polymer comprises a polysaccharide.

14. The composition of claim 13, wherein the polysaccharide is selected from the group comprising hyaluronic acid, hydroxypropylmethylcellulose, chondroitin sulfate, methylcellulose, carboxymethylcellulose, hydroxyethylcellulose, hydroxypropylcellulose, ethylcellulose, alginic acid, pectin, dextrans, collagen, proteoglycans, polyvinylpyrrolidone, keratin carrageenans and derivatives thereof and salts thereof and combinations thereof.

15. The composition of claim 1, wherein the viscoelastic polymer comprises alginic acid.

16. The composition of claim 15, wherein the concentration of alginic acid is a minimum of about 0.05%w/v and a maximum of about 9%w/v based upon the volume of the viscoelastic composition.

17. The composition of claim 15, wherein the average molecular weight of the alginic acid composition of yet minimum of about 50 kD and a maximum of about 5,000 kD.

18. The composition of claim 1, wherein the viscoelastic polymer comprises a mixture of hyaluronic acid and/or salts thereof and hydroxypropylmethylcellulose.

19. The composition of claim 18, wherein the concentration of hyaluronic acid and/or salts thereof is a minimum of about 0.1%w/v and a maximum of about 6%w/v based upon the volume of the viscoelastic composition.

20. The composition of claim 19, wherein the average molecular weight of the hyaluronic acid and/or salts thereof composition of yet minimum of about 500 kD and a maximum of about 5000 kD.

21. The composition of claim 18, wherein the concentration of hydroxypropylmethylcellulose is a minimum of about 0.05%w/v and a maximum of about 5%w/v based upon the volume of the viscoelastic composition.

22. The composition of claim 21, wherein the average molecular weight of the hydroxypropylmethylcellulose composition of yet minimum of about 10 kD and a maximum of about 120 kD.

23. The composition of claim 1, wherein the average molecular weight of the viscoelastic polymer is a minimum of about 20 kD and a maximum of about 5,000 kD.

24. The composition of claim 1, wherein the concentration of the viscoelastic polymer is a minimum amount of about 0.01%w/v and a maximum amount of about 20%w/v based upon the total weight of the viscoelastic composition.

25. The composition of claim 1, wherein the osmolality of the viscoelastic composition is a minimum of about 200mOsmol/Kg and a maximum of about 400mOsmol/Kg.

26. The composition of claim 1, wherein the zero-shear viscosity of the viscoelastic composition is a minimum of about $6 \cdot 10^4$ cps and a maximum of about $4 \cdot 10^6$ cps.

27. The composition of claim 1, wherein the high-shear viscosity of the viscoelastic composition is a minimum of about 500 cps and a maximum of about 2000 cps.

28. The composition of claim 1, wherein the pH of the viscoelastic composition is a minimum of about 5 and a maximum of about 8.

29. A method of temporarily maintaining space in a cavity in human tissue, the method comprising the steps of:

- (a) injecting the viscoelastic composition of claim 1 into the cavity; and
- (b) removing the viscoelastic composition from the cavity.

30. The process of claim 29, wherein the cavity is the anterior chamber of the eye or the capsular bag.

31. A method of protecting tissue from trauma during a surgical procedure, the method comprising the steps of:

- (a) coating at least a portion of the tissue with the viscoelastic composition of claim 1;
- (b) performing a surgical procedure near the tissue after the step of (a) coating; and

(c) removing at least a portion of the viscoelastic composition from the tissue after the step of (b) performing.

32. The method of claim 31, wherein the step of (a) coating covers at least a portion of the tissue in an anterior chamber of an eye.

33. The method of claim 31, wherein the step of (a) coating covers at least a portion of the tissue in a capsular bag of an eye.

34. A method of replacing a natural lens from an eye, the method comprising the steps of:

- (a) providing a passage through a sclera into an anterior chamber of the eye;
- (b) removing at least a portion of the aqueous humor from the anterior chamber;
- (c) inserting the viscoelastic composition of claim 1 into the anterior chamber;
- (d) phacoemulsifying a lens in the capsular bag of the eye;
- (e) removing substantially all of the lens from the capsular bag;
- (f) injecting the viscoelastic composition into the capsular bag; and
- (g) inserting an intraocular lens into the capsular bag.

35. The method of claim 34, further comprising the step of (b) removing at least a portion of the viscoelastic composition from the capsular bag.

36. The method of claim 34, further comprising the step of (b) removing at least a portion of the viscoelastic composition from the anterior chamber.

37. The method of claim 36, further comprising the step of suturing the sclera after the step of (g) inserting an intraocular lens.

38. The method of claim 34, wherein the step of inserting comprises coating the intraocular lens with the viscoelastic composition and delivering the intraocular lens through a cannula.

39. The method of claim 38, wherein the cannula has a tip configured to be inserted into the capsular bag, wherein the tip of the cannula has an inner diameter that is a maximum of about 1 mm.

43. The method of claim 38, wherein the step of delivering the intraocular lens through the cannula requires a maximum force of about 30 N.

44. A package for a viscoelastic composition, the package comprising a syringe containing the viscoelastic composition of claim 1.

45. The package of claim 44, wherein the syringe has an outlet port, the package further comprises a cannula configured to sealably connect to the outlet port having a maximum inner diameter of about 2 mm.

46. The package of claim 44, wherein viscoelastic composition requires a maximum force of 30 N to pass through the cannula.